

SECTION 606

GUARDRAIL AND MEDIAN BARRIER RAIL

606.01 DESCRIPTION. This work is furnishing, installing, removing, resetting, and revising metal beam guardrail, cable guardrail, and concrete median barrier rail and posts.

606.02 MATERIALS. Furnish metal beam guardrail, cable guardrail, and concrete median barrier rail meeting the following :

| | |
|---|---------------------|
| Steel Beam Guardrail and Fittings | Subsection 705.01.1 |
| Guardrail Posts and Blocks | Subsection 705.01.2 |
| Wire Rope and Connecting Hardware | Subsection 705.02 |
| Concrete Median Barrier Rail | Section 554 |

606.03 CONSTRUCTION REQUIREMENTS.

606.03.1 General. Install guardrail and median barrier rail as shown in the Detailed Drawings and meeting the Contract requirements.

The Project Manager will establish the line and grade for terminal end sections. Establish line and grade between the terminal end sections.

Correct any vertical or horizontal mis-alignment to the specified line and grade at Contractor expense.

Individual guardrail runs shall normally be completed in one working day, including post placement and metal beam and the terminal section. Complete installation within 48 hours of starting work, on guardrail installations with difficult post placement conditions, which could not be completed in one working day without additional resources. Place hazard panels at maximum 50 foot (15.2 m) spacing to delineate partial installation areas (e.g. areas to receive guardrail but no work has begun) when work on those installations is not active.

Stop work when the excavation or post driving methods and equipment damages adjacent pavement.

Stop post driving that heaves the adjacent pavement more than ½-inch (13 mm) in 10 feet (3 m), measured with a 10 foot (3 m) straightedge parallel to the pavement.

Level and repair all damaged surfaces around installed posts as directed.

Use only one type of post, wood or concrete, for metal beam guardrail in each run, except where wood posts are specified.

When wood posts and blocks are damaged, cut or bored after treatment, treat the injuries, cuts, and holes with three applications of a copper naphthenate solution containing a minimum two percent copper metal or with chromated copper arsenate (CCA) complying with AWP A M4.

606.03.2 Placing Post By Excavation and Backfill. Dig post holes a minimum 18-inches (460 mm) in diameter.

Compact the post hole bottom, insert the post, backfill and compact around the post in 6-inch (155 mm) loose depth layers with the material at optimum moisture

before placing the next layer. Use power equipment to compact backfill. Maintain line and grade.

606.03.3 Driving Posts. Always drive steel posts. Wood and concrete posts may be placed by excavating and backfilling or by driving.

Use caps that protect the post top when driving posts.

Maintain the post alignment while driving the posts.

Fill voids between the soil and the post by backfilling and tamping. Re-compact loose material around the post and level the area as directed.

Remove, replace or re-install misaligned, loose or damaged posts at Contractor expense.

Pilot holes approximately 6-inches (155 mm) in diameter may be used when necessary.

606.03.4 Metal Beam Guardrail Erection. Install metal beam guardrail, including breakaway cable terminal assemblies (BCT), parabolic flares, end anchorages, and bridge approach sections installations as shown in the Detailed Drawings and meeting the Contract requirements.

Splice the metal rail units with the lap in the direction of traffic. Locate all splices at a post. Construct splices, laps, and terminal connectors as shown in the Detailed Drawings and meeting the Contract requirements. Splice the terminal connectors for attaching rail units to bridge ends to the rail units by lapping as shown in the Detailed Drawings.

Tighten the bolts through the splices and mounting bolts to a "snug tight" condition as defined in Subsection 556.03.9(E)(3)(a).

Assure bolts extend at least 1/4-inch (6 mm) beyond the nut. Place bolt heads on the traffic side of the guardrail.

Paint Contractor made holes, slots, or cut ends in new or salvaged metal guardrail with an approved galvanizing paint. Spot paint all bruised, broken, scaled, or damaged spelter coating on metal parts following the paint manufacturer's recommendations after erection.

606.03.5 Cable Guardrail. Install cable guardrail, including end anchorages meeting the Contract requirements and as shown in the Detailed Drawings.

606.03.6 Concrete Median Barrier Rail. Install concrete median barrier rail meeting the Contract requirements and as shown in the Detailed Drawings.

606.03.7 Remove and Remove and Reset Guardrail. Remove the existing guardrail from the specified locations meeting the applicable requirements of Section 202. Replace guardrail damaged during removal and re-setting at Contractor expense. Dispose of removed materials not to be reset or salvaged.

Provide all additional materials required to reset the guardrail to the Contract requirements at Contractor expense. Be responsible for the condition and care of the guardrail material during removal until final disposition.

All salvaged materials not damaged or defective and that meet the Contract requirements are available to the Contractor at no cost for use in the work. Stockpile

salvaged materials not designated for use in new installations as specified. These materials are the Department's property.

Backfill open post holes with clean, compactable material or crushed base or top surfacing, to the bottom elevation of the adjacent bituminous surfacing. Lightly spray the remaining portion of the hole with asphalt on the bottom and sides and backfill with plant mix bituminous surfacing. Compact the backfill and plant mix surfacing as specified.

Cutting off of existing posts is prohibited.

Use new materials meeting Subsection 606.02 to reset guardrail except as permitted above.

606.03.8 Raise Guardrail. Raise the existing guardrail to the specified height.

Raise guardrail by removing the rail elements or cable, and completely removing the post. Backfill and compact the post holes to the required depth, and re-install the posts and rail elements or cable to the specified height.

Replace all guardrail materials damaged during the work at Contractor expense.

Provide a smooth and uniform appearance at the specified height. Correct all horizontal and vertical alignment in the guardrail to the specified line and grade.

606.03.9 Revise Guardrail Elements. Reconstruct items designated to be revised as specified. The items include but are not limited to bridge approach sections, terminal sections, and end anchors.

606.03.10 Stiffened Guardrail Sections. Construct stiffened guardrail sections as shown in the Detailed Drawings.

606.04 METHOD OF MEASUREMENT.

606.04.1 Metal Guardrail. Metal guardrail, including terminal sections, is measured by the linear foot (meter) to the nearest 0.1 foot (0.1 m) from center-to-center of the end posts of each section.

606.04.2 Metal Guardrail End Anchors. BCT end anchors, 5 foot (1.5 m) radius end anchors, and buried end anchors are measured by the unit for each type specified.

606.04.3 Bridge Approach Sections. Bridge approach sections, including tapered curbs, are measured by the unit for each type specified.

606.04.4 Concrete Median Barrier Rail. Concrete median barrier rail, including the tapered ends, transition sections, and connections to existing median barriers, are measured by the linear foot (meter) to the nearest 0.1 foot (0.1 m) from end-to-end of each section. Measurement does not include those portions of median barrier constructed as an integral part of sign foundations.

606.04.5 Remove Guardrail and Reset Guardrail. Remove guardrail is measured by the linear foot (meter) from center-to-center of end posts of each section removed.

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Reset guardrail is measured by the linear foot (meter) from center-to-center of the end posts of each section reset.

606.04.6 Raise Guardrail. Raise guardrail, including terminal sections, is measured by the linear foot (meter) from center-to-center of the end posts of each section.

606.04.7 Cable Guardrail. Cable guardrail is measured by the linear foot (meter) to the nearest 0.1 foot (0.1 m) from center-to-center of the end posts of each section.

606.04.8 Cable Guardrail Anchor Sections. Cable guardrail end anchor sections and road approach anchor sections are measured by the unit for each type specified.

606.04.9 Revise Guardrail Elements. Revise guardrail elements is measured by the unit for each element revised, as specified in the Contract.

606.04.10 Stiffened Guardrail Sections. Stiffened guardrail sections are measured by the linear foot (meter) to the nearest 0.1 foot (0.1 m) from center-to-center of the end posts of each stiffened section.

606.05 BASIS OF PAYMENT. Payment for the completed and accepted quantities is made under the following.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|--------------------------------------|------------------------|
| Metal Guardrail | Linear Foot (meter) |
| Metal Guardrail End Anchor | Each |
| Bridge Approach Sections | Each |
| Concrete Median Barrier Rail | Linear Foot (meter) |
| Remove Guardrail and Reset Guardrail | Linear Foot (meter) |
| Raise Guardrail | Linear Foot (meter) |
| Cable Guardrail | Linear Foot (meter) |
| Cable Guardrail Anchor Sections | Each |
| Revise Guardrail Elements | Each |
| Stiffened Guardrail Sections | Linear Foot (meter) |

Revise guardrail elements is paid for under "Revise Bridge Approach Section"-each, or "Revise Guardrail Terminal Section"-each.

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work under the Contract.